

Fig. 1

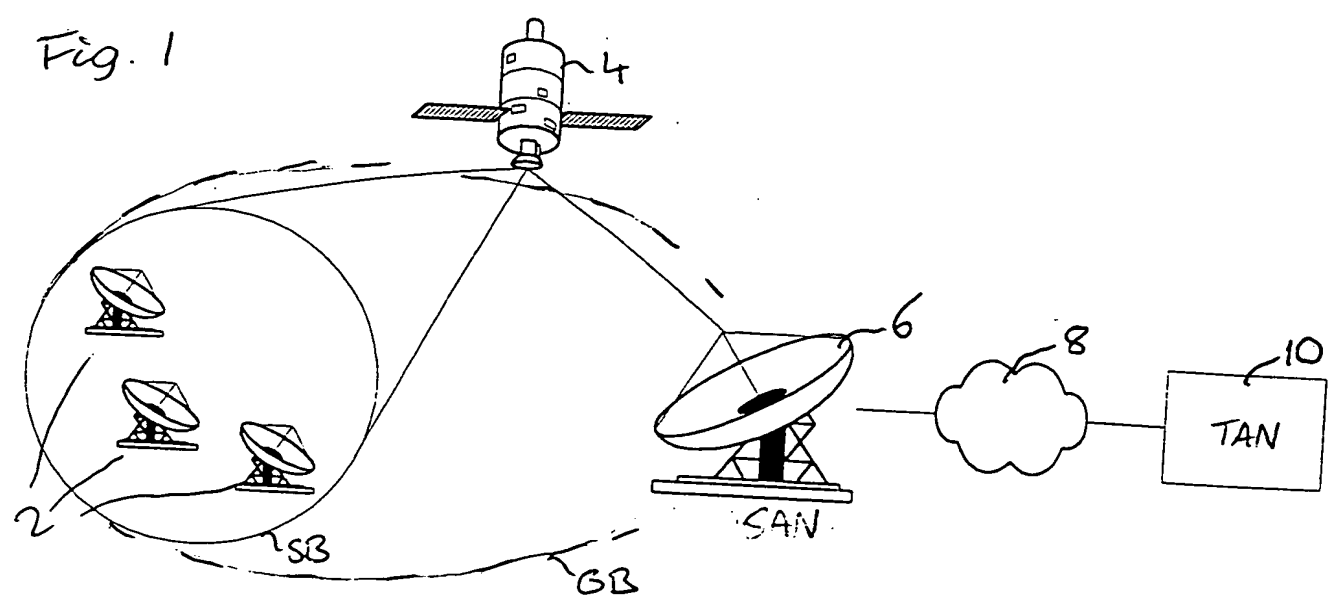


Fig. 2

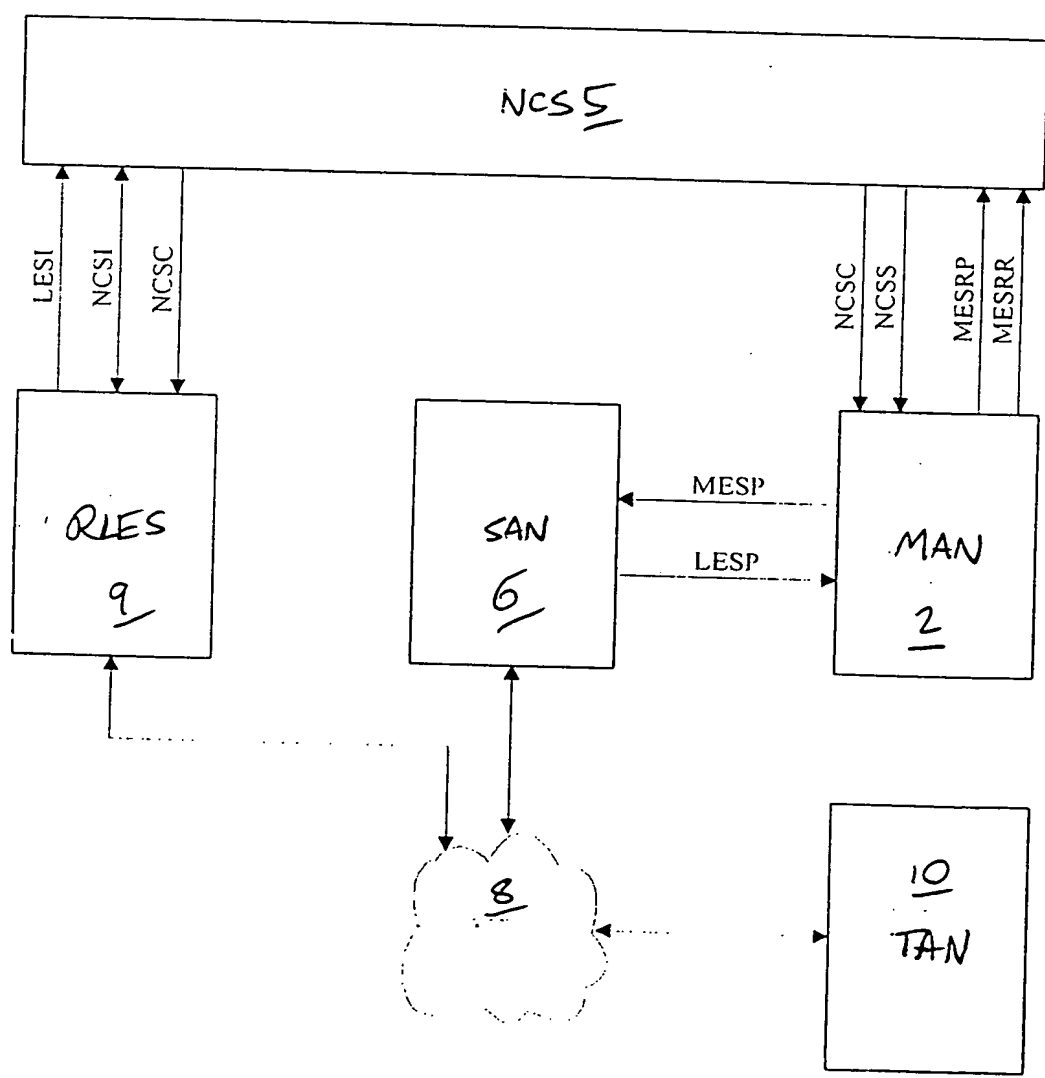
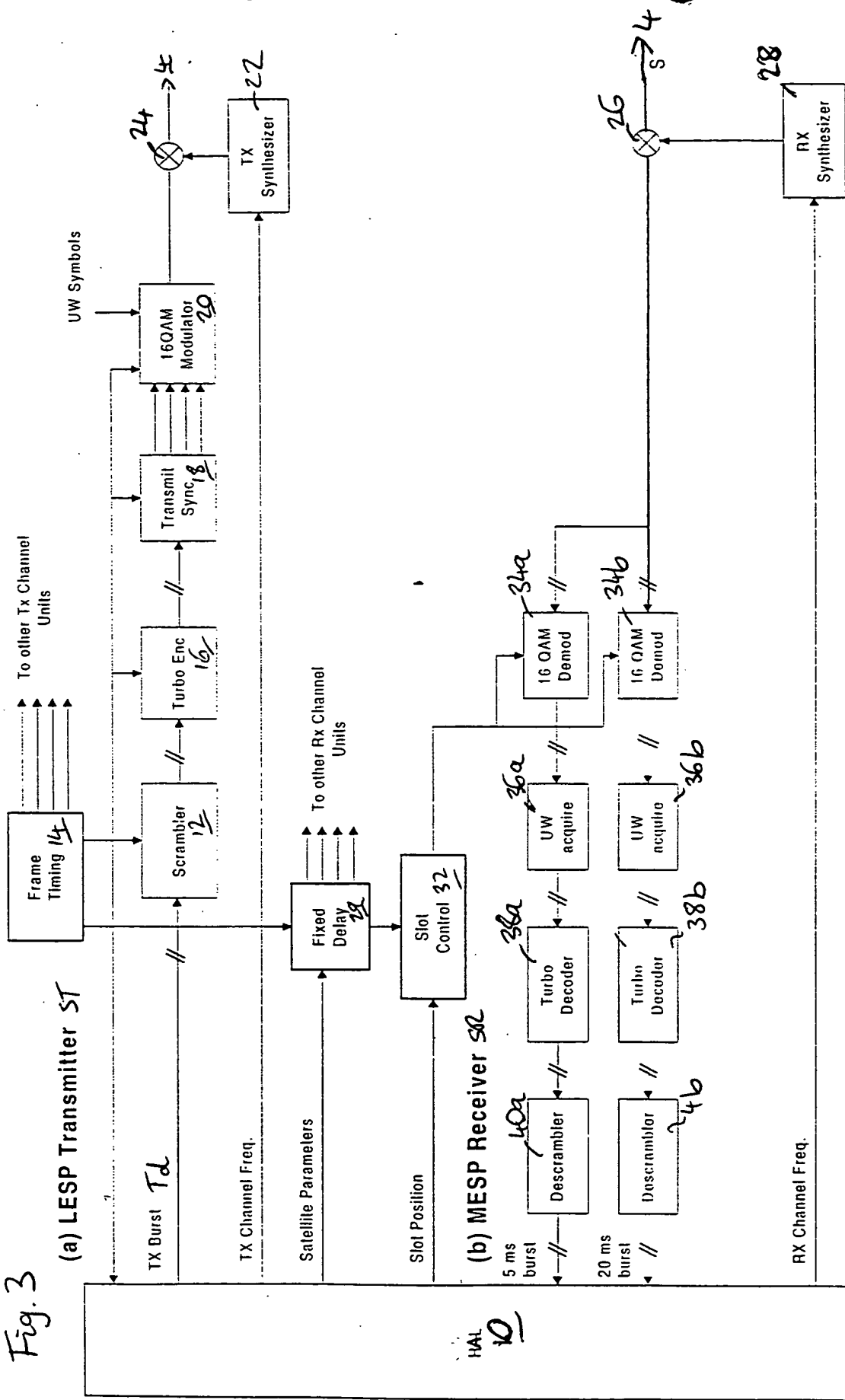


Fig. 3



(a) LESP Receiver \mathcal{MR}

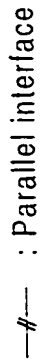
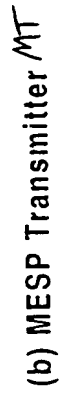


Fig. 5a

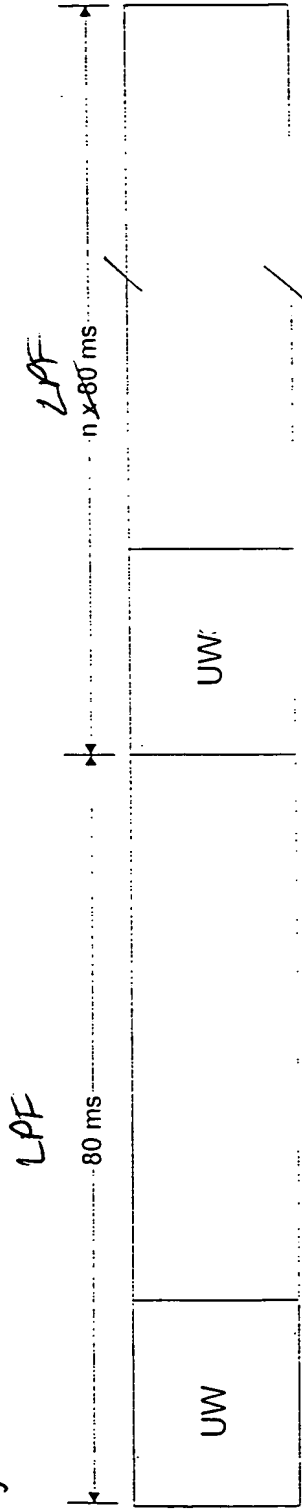


Fig. 5b

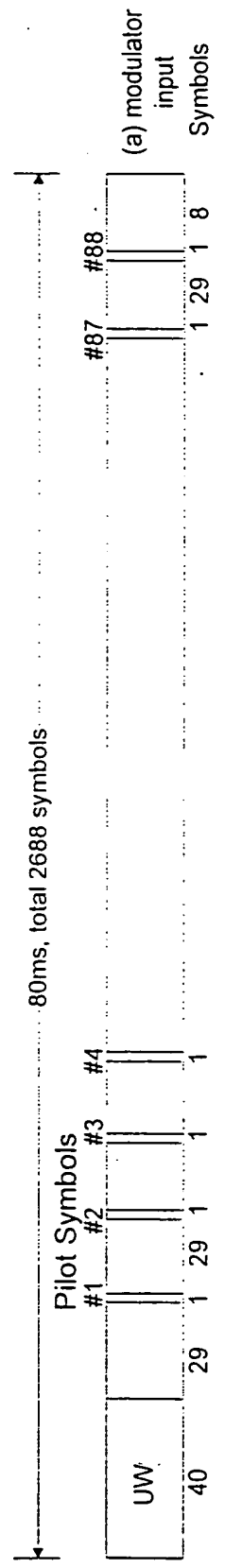
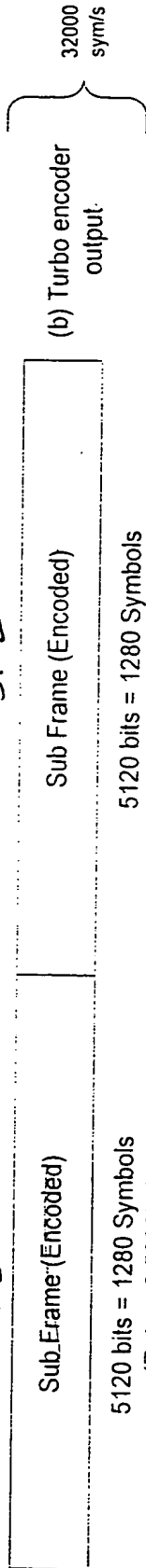


Fig Sc

SF1

SF2

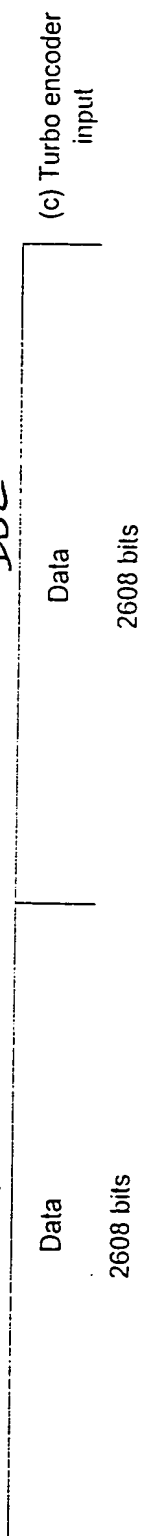


(b) Turbo encoder output

Fig Sd

IB1

IB2



(c) Turbo encoder input

Fig. 6a

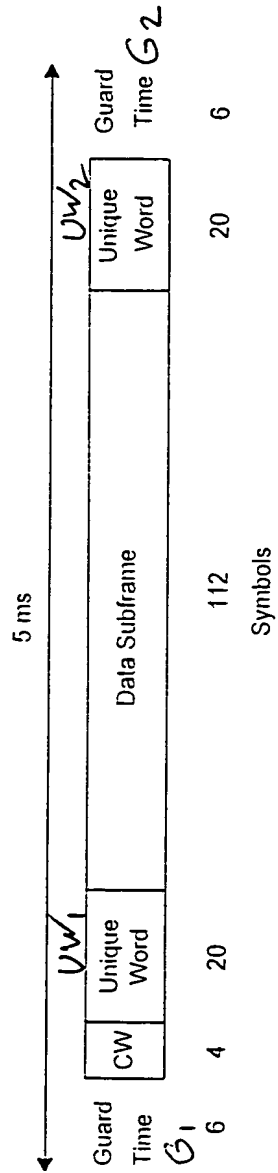


Fig. 6b

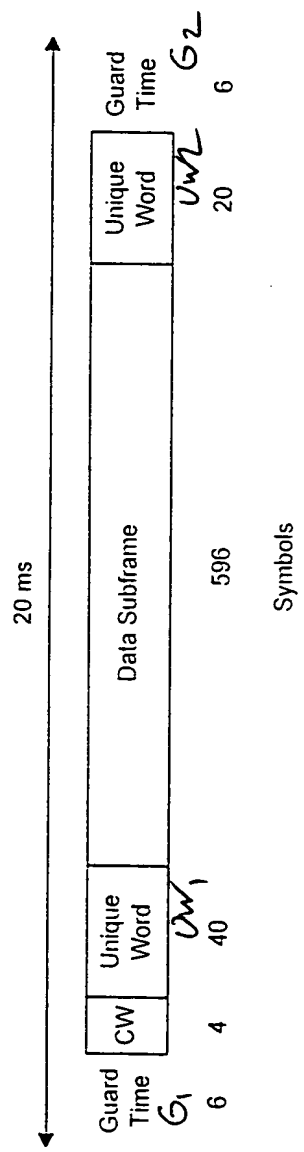


Fig.7

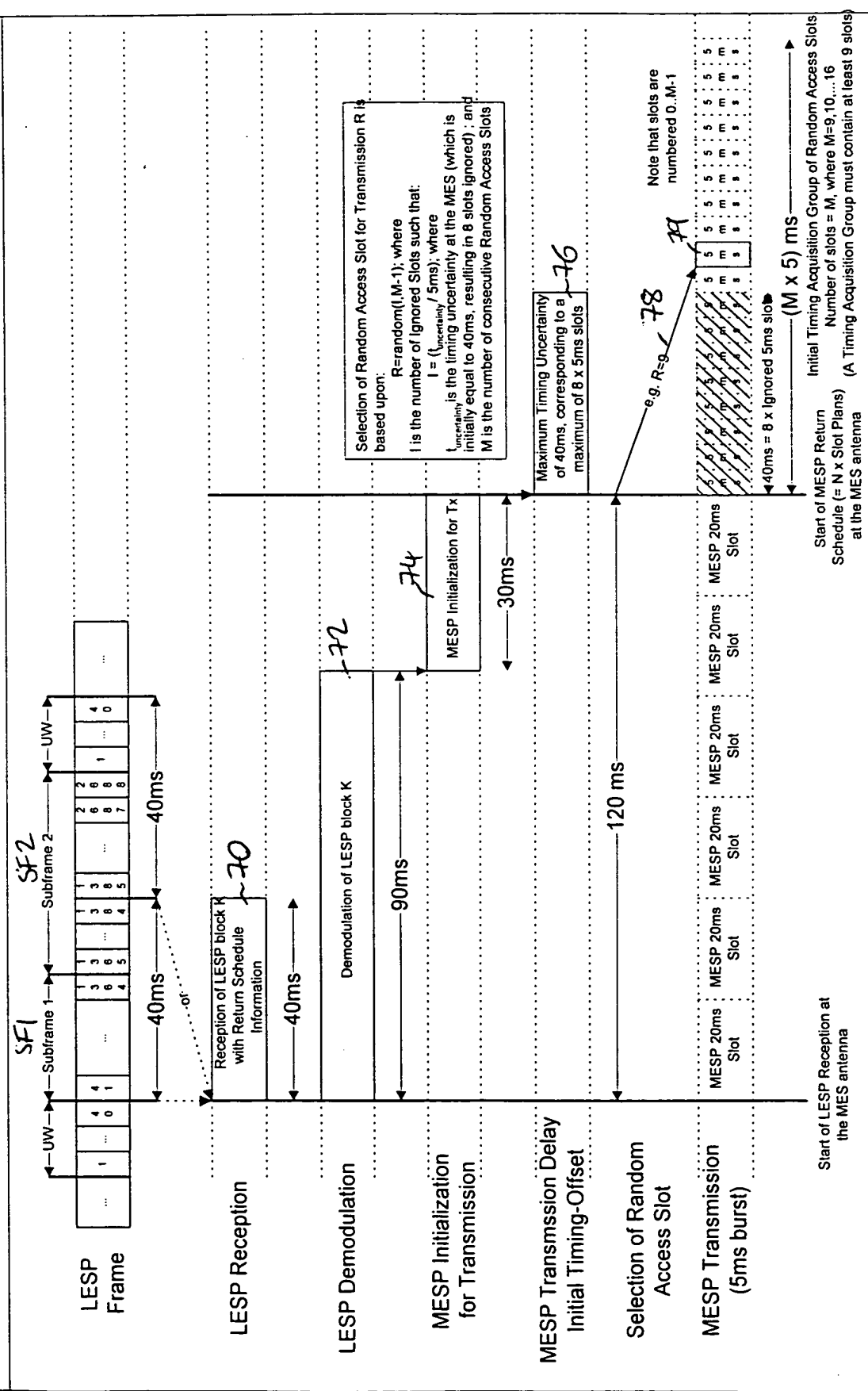
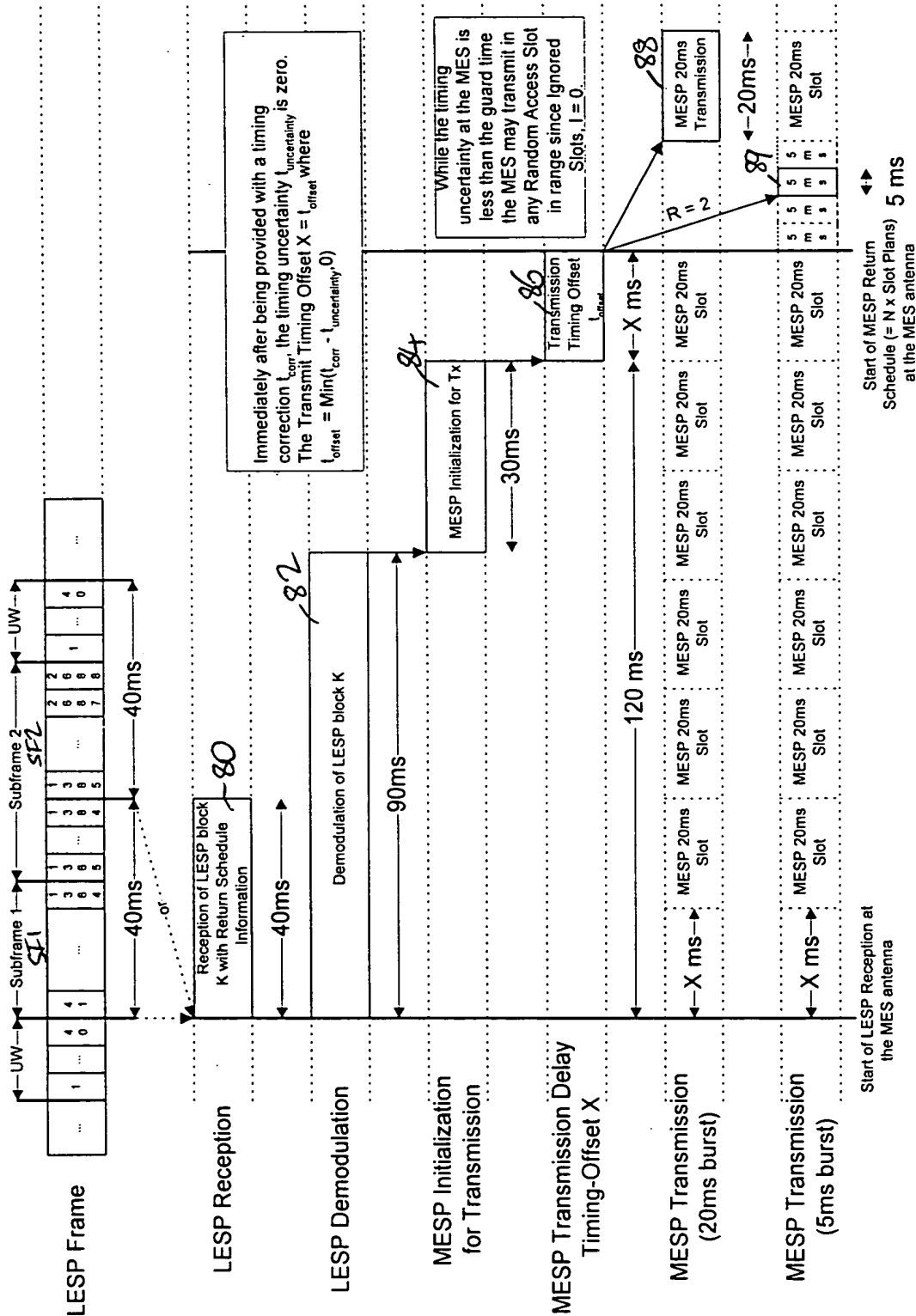


Fig. 8a



The diagram illustrates the timing sequence for the MESP (Multi-Element Slot Protocol) system, showing the relationship between various frames and slots.

LESP Frame: The frame is divided into Subframe 1 and Subframe 2, each with a duration of UW . Subframe 1 contains slots 1, 4, 0, 1, and Subframe 2 contains slots 2, 2, 6, 6, 1, 4, 0. The total duration of the LESP frame is $40ms$.

LESP Reception: The reception of LESP block K with Return Schedule Information is shown, with a duration of $40ms$.

LESP Demodulation: The demodulation of LESP block K is shown, with a duration of $90ms$.

MESP Initialization for Transmission: The initialization for transmission is shown, with a duration of $30ms$.

MESP Transmission Timing-Offset X: The timing offset X is shown, with a duration of $120ms$.

MESP Transmission (20ms burst): The transmission of a 20ms burst is shown, with a duration of Xms .

MESP Transmission (5ms burst): The transmission of a 5ms burst is shown, with a duration of Xms .

Start of MESP Reception at the MES antenna: The start of MESP reception at the MES antenna is shown, with a duration of Xms .

Start of MESP Return Schedule (= N x Slot Plans) at the MES antenna: The start of MESP return schedule at the MES antenna is shown, with a duration of Xms .

Timing Diagram Details:

- The timing uncertainty $t_{uncertainty}$ is determined by the limiting uncertainty rate $R_{uncertainty}$ and the interval since the time of last correction $T_{now} - T_{correct}$, bounded by $40ms$, such that: $t_{uncertainty} = \min(T_{now} - T_{correct}, 40ms) \cdot R_{uncertainty}$.
- The Transmit Timing Offset $t_{offset} = X$ where $X = \min(t_{cor} - t_{uncertainty}, 0)$.
- The number of slots to ignore l is determined by: $l := \text{INT} \left[\frac{(t_{slot} - t_{guard} + t_{uncertainty})}{t_{slot}} \right]$ where $t_{slot} = 5ms$, $t_{guard} = \text{guard time}$.
- Random Access Slot Selected: $R = \text{Random}(l, M-1)$.
- In this example, $t_{uncertainty} = 7ms$, therefore ignored slots $l = 2$. $M = 4$, possible values for $R = (2, 3)$, selected value for $R = 2$.

Slot Plans: The diagram shows the slot plans for the MESP system, including the MESP 20ms Slot and the MESP 5ms Slot. The total duration of the MESP transmission is $120ms$.

10/10

Fig. 9a

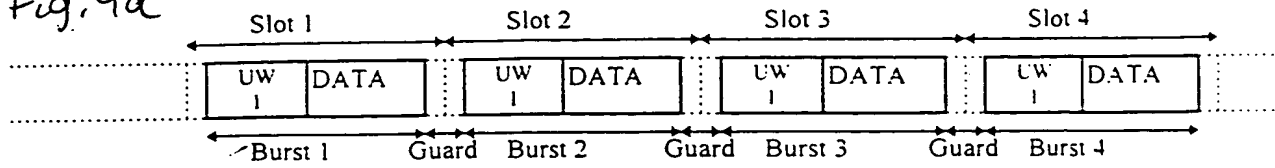


Fig. 9b

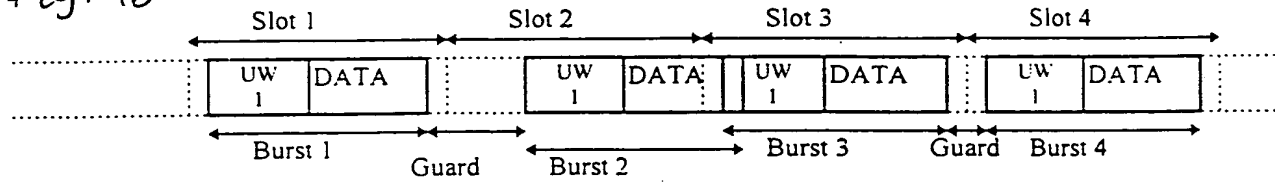


Fig. 9c

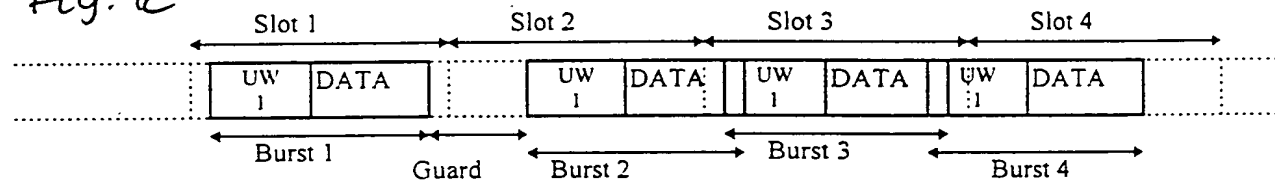


Fig. 10a

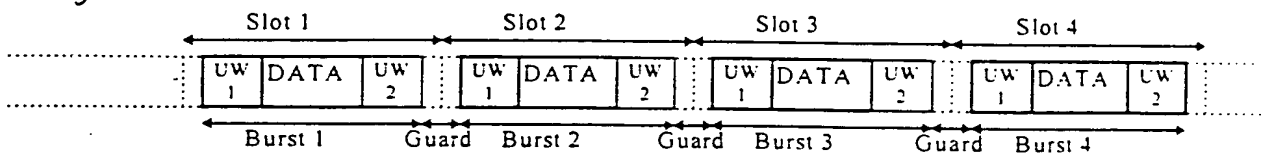


Fig. 10b

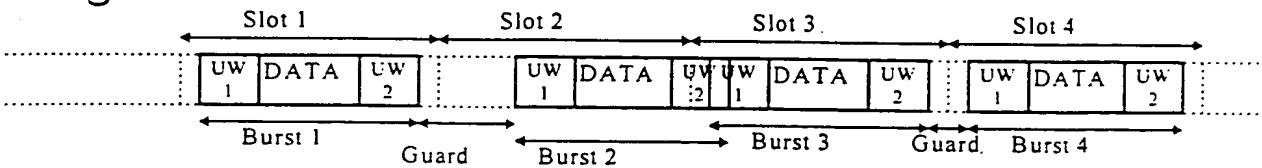


Fig. 10c

